Defense MicroElectronics Activity

DMSMS Tutorial

How to Manage DMSMS

(Session 2)

How to Manage DMSMS

- Challenges for Program Managers
- DMSMS Management Styles
  - Reactive
  - Proactive
- DMSMS Management Tools
- The Use of Common Practices to Manage DMSMS
  - Level 1 - Initial
  - Level 2 - Increased
  - Level 3 - Intensive
- Resolution Cost Metrics

Challenges for Program Managers

Leverage

- No leverage over semiconductor industry
  - Military share of the microcircuit market is miniscule (~0.1%)
- Small orders or old processes result in “No bids”

Time

- When manufacturers discontinue production, PMs are given little/no notice
- DoD has long design-to-acquisition lead times; can’t react fast enough

Manpower

- An accurate indentured parts list requires work—and constant updating
- For each discontinuance notice: Does it affect my system?
  - If so, how severely? A cost-effective decision is then needed
- Without knowledge of the system, manpower costs escalate

Funding

- DoD funding rules constrain the amount of spares one can buy/hold
- Surprise problems (discontinuances) have little funding for solutions

DMSMS Management Styles

RE-ACTIVE

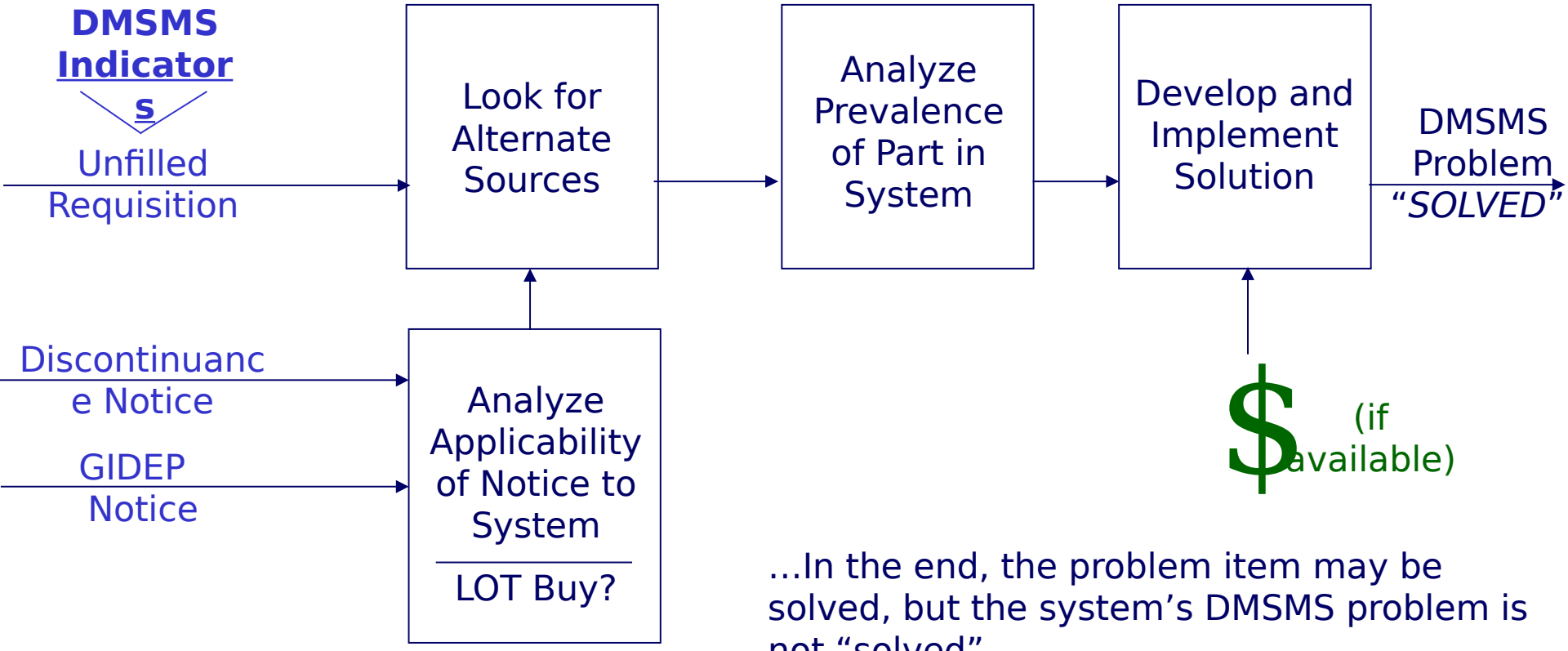
1. You *may* have the original Provisioning Parts List
2. You learn a component is unavailable from:
   - GIDEP Notice
   - Unfilled requisition
3. Actions follow the service's Case Resolution Guide

PROACTIVE

1. You have a complete list of all the parts in your system
2. You try to predict a component life cycle
   - Obsolescence Prediction Tool
3. Actions follow varying levels of *Common Practices*

(Proactively-managed DMSMS programs have realized cost avoidance ratios greater than 6-to-1)

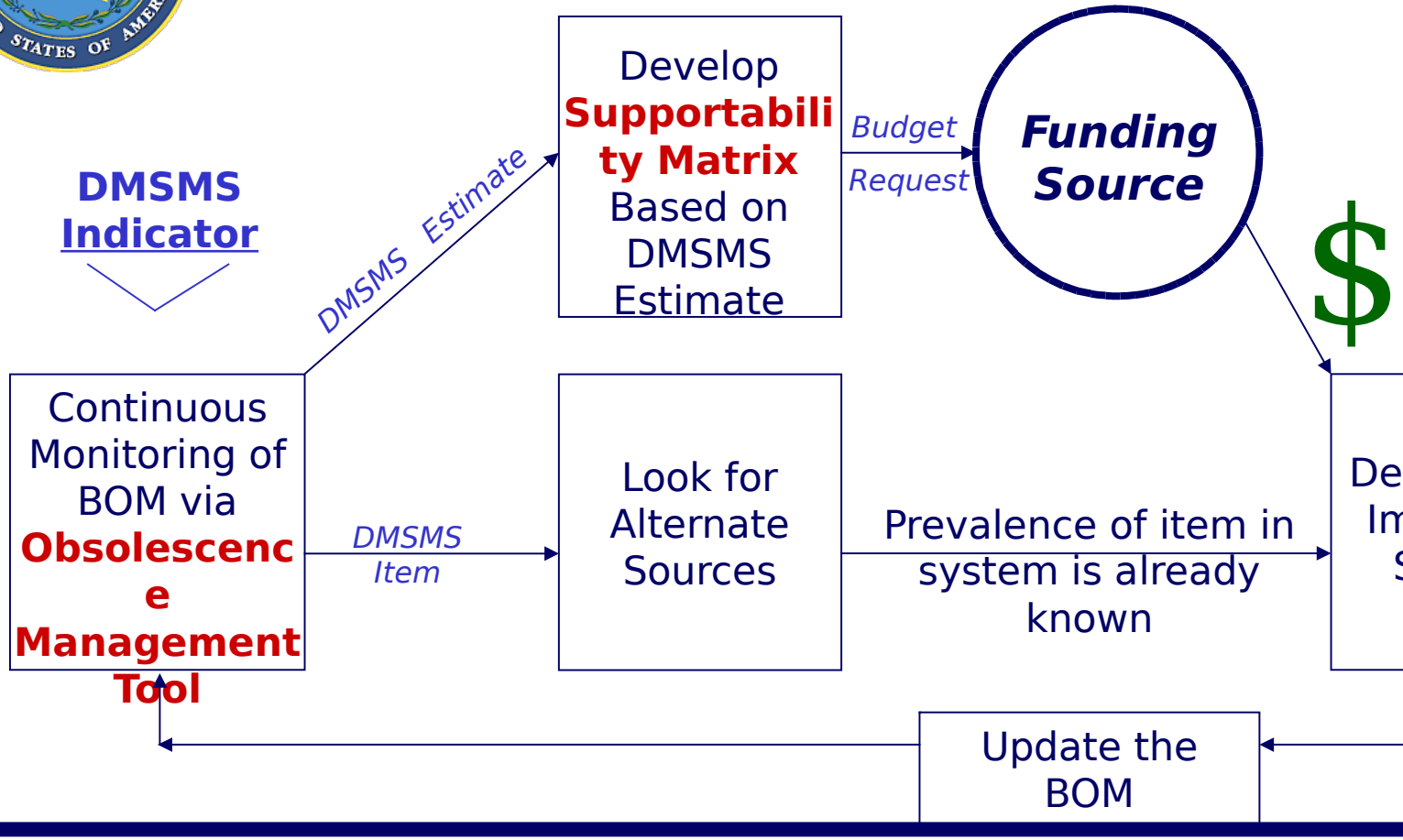
Reactive DMSMS Process



…In the end, the problem item may be solved, but the system's DMSMS problem is not "solved".

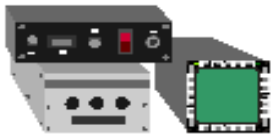
-DMSMS items are not identified until they become a problem; no time for effective resolution -System downtime is a possibility if an unfilled requisition is not anticipated -Manpower per DMSMS item is high since the whole system is analyzed for each problem -DMSMS funding has not been budgeted; funds must be shifted from other uses

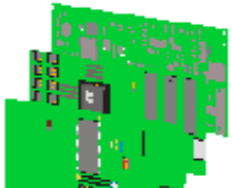
Proactive DMSMS Process

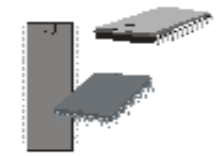


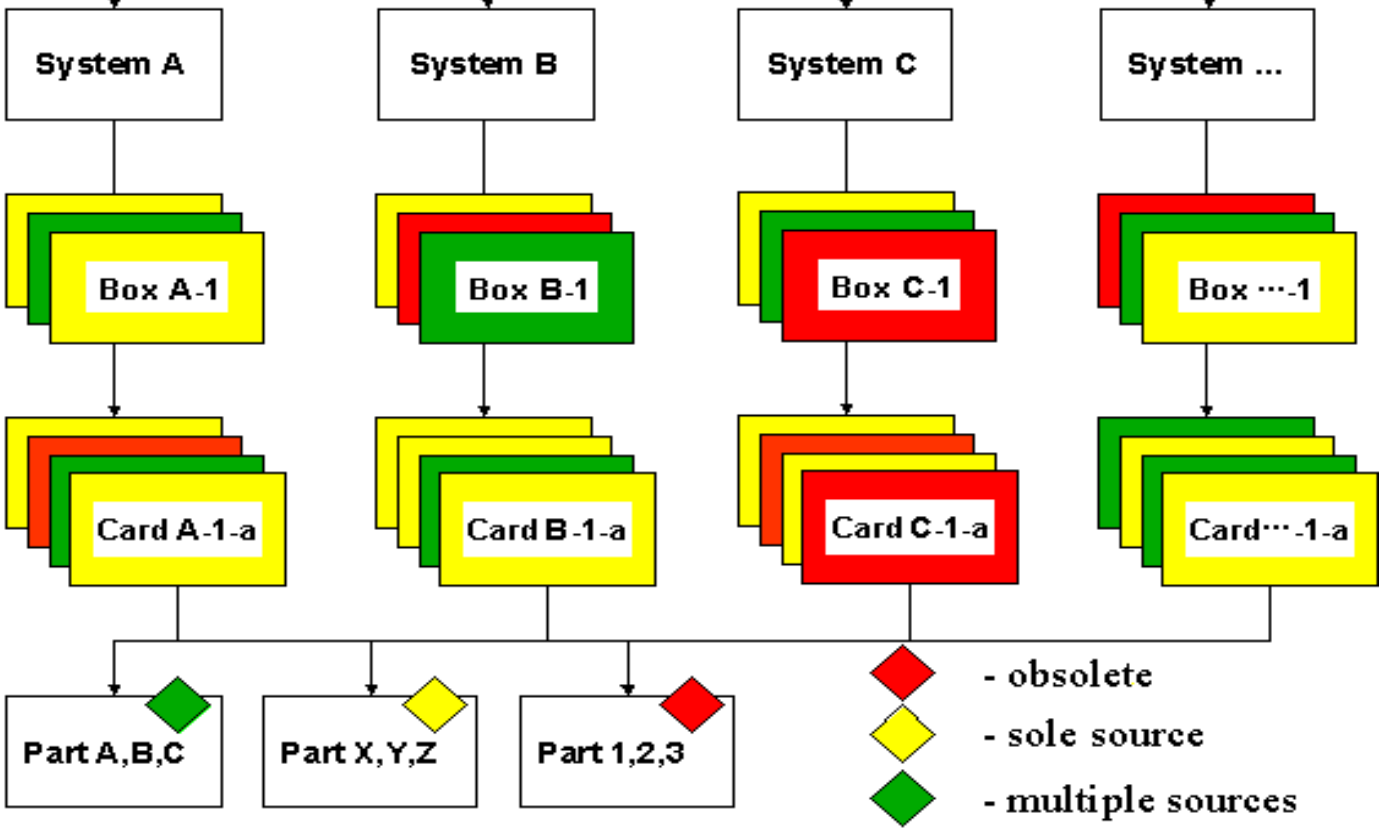
-DMSMS items are identified **before** they become a problem, in time for effective resolution -System downtime is effectively eliminated due to advance notice of problems -Manpower per DMSMS item is decreased due to existing knowledge of system -DMSMS funding has been budgeted, & should be available for implementing the resolution

Obsolescence Management Tool









Supportability Matrix

Card	% of Obsolete IC's	Repairable Spares On Hand	Annual Usage Rate	Supportability*
Card 1	25%	41	10/Year	4 Years
Card 2	55%	30	14/Year	2 Years
Card 3	65%	45	6/Year	7 Years
Card 4	90%	500	50/Year	10 Years
Card 5	10%	3	5/Year	8 Months
Card 6	86%	400	35/Year	11 Years

* Estimated time before lack of spares will cause mission downtime

Budgeting for DMSMS

Card	% of Obsolete IC's in Yr XX	Repairable Spares On Hand	Annual Usage Rate	Supportability	FY * Budget
Card 1	25%	50	10/Year	5 Years	FY06
Card 2	40%	42	14/Year	3 Years	FY04
Card 3	65%	45	5/Year	9 Years	FY10
Card 4	90%	500	50/Year	10 Years	FY11
Card 5	10%	3	5/Year	8 Months	FY02
Card 6	86%	700	35/Year	20 Years	FY21

* - Budget based on most cost effective solution (IC, Card, Box, other)

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The Use of Common Practices to Manage DMSMS

Common Practices: Background

- The purpose of the consolidation of Common Practices is to define and promote the all-encompassing practices currently in use by managers in government and industry DMSMS programs
- Accepting DMSMS management at the highest programmatic levels and contractually invoking practices assures the goal of least total ownership cost
- Implementing practices developed by the DoD and industry over the past decade+, allows program managers to actively manage DMSMS
- Selecting practices judiciously minimizes the impact of DMSMS
- Incorporating timely and cost-effective engineering practices during all life cycle phases will minimize the impact of DMSMS

Program Managers Handbook

- DMSMS Common Practices are documented in the *PROGRAM MANAGERS HANDBOOK – Common Practices to Mitigate the Risk of Obsolescence*

While complementing the services' Case Resolution Guides, the Handbook…

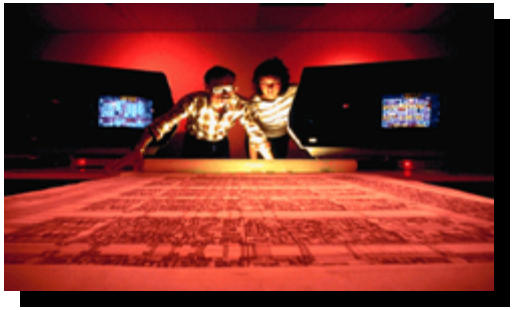
- Consolidates the common practices, resource listings and reference materials that program managers are currently accessing to address the obsolescence issue.

- Documents techniques and strategies to assist the program manager in identification, selection, budgeting, implementing and scheduling the common practices which offer the most promising cost avoidance within available resource constraints.

Intended Audience

- The handbook provides a shopping list of common practices and resources for:
  - New program managers recently introduced to DMSMS
  - New system developer program managers
  - Production managers
  - Sustainment program managers
- Beyond program managers, it is envisioned that all levels and functions of product team contributors will benefit from study of this handbook.

Common Practice Levels



- Level 1- Practices are implemented to resolve current obsolete items. Some of these activities may be considered reactive.
- Level 2 - Minimal required practices are needed to mitigate the risk of future obsolete items. The majority of these activities are perceived as proactive.
- Level 3 - Advanced practices are required to mitigate the risk of obsolescence when there is a high opportunity to enhance supportability or reduce total cost of ownership. These proactive activities may require additional program funding.

The Possible Practices (Building Blocks for a DMSMS Program)

Level 1
- DMSMS Focal Point
- Awareness Briefing
- Internal Communications
- External Communications
- DMSMS Plan
- Parts List Screening
- Parts List Monitoring
- Resolution of Current Items
- Supportability Checklist

Level 2
- Awareness Training
- DMSMS Prediction
- DMSMS Teaming Group
- COTS List
- DMSMS Solution Database
- Opportunity Index
- Web Site

Level 3
- Circuit Design Guidelines
- VHDL
- Technology Assessment
- EDI
- Technology Insertion

Suggested Implementation Phase

Common Practices	Acquisition Phase			
	Concept Exploration	Program Definition Risk Reduction	Engineering Manufacturing Development	Production Fielding/Deployment Operational Support
DMSMS Focal Point		✓	✓	✓
Awareness Briefing	✓	✓	✓	✓
Internal Communications		✓	✓	✓
External Communications			✓	✓
DMSMS Plan		✓	✓	✓
Parts List Screening			✓	✓
Parts List Monitoring			✓	✓
Resolution of Current Items			✓	✓
Supportability Checklist			✓	✓
Awareness Training	✓	✓	✓	✓
DMSMS Prediction			✓	✓
DMSMS Steering Group			✓	✓
COTS List			✓	✓
DMSMS Solution Database			✓	✓
Opportunity Index			✓	✓
Web Site			✓	✓
Circuit Design Guidelines		✓	✓	✓
VHDL			✓	✓
Technology Assessment			✓	✓
EDI			✓	✓
Technology Insertion			✓	✓
Typically most cost effective phase				

The Practice Selection Process

- Selection and investment in appropriate practices can be a judicious cost-avoidance strategy. This process is influenced by several program-unique factors:
  - Life cycle phase
  - Management philosophy
  - Program complexity
  - Available resources
- Example 1: An aircraft program out of production, with complex avionics and management commitment would consider all practices
- Example 2: A program manager responsible for only 2 or 3 boxes, with open system architecture, and high reliability modules may only have to consider level 1 or 2 practices

Additional Selection Guidelines

While considering program unique factors…

- When applicable, conduct the following tasks
  - Supportability analysis
  - Reliability improvement study
  - Configuration audit

If program managers require further assistance…

- The selection of practices could be event driven. These events are called triggers.

  - Qualitative
  - Quantitative (Level 2 values based on typical DoD systems)

Level 1 Triggers and Practices

If any of these events occur …

- Initial DMSMS awareness by PM
- <10% of parts unsupportable
- <10 years remaining in system life cycle

…implement any of these

- DMSMS Focal Point
- Awareness Briefing
- Internal Communications
- External Communications
- DMSMS Plan
- Parts List Screening
- Parts List Monitoring
- Resolution of Current Items
- Supportability Checklist

…All programs should implement some Level 1 practices

Level 2 Triggers and Practices

If any of these events occur …

- Increased awareness from PM
- 10–20% of parts unsupportable
- 10–20 years remaining in system life cycle

…implement any of these

- Awareness Training
- DMSMS Prediction
- DMSMS Teaming Group
- COTS List
- DMSMS Solution Database
- Opportunity Index
- Web Site

…also consider any Level 1 practices

Level 3 Practices and Triggers

If any of these events occur …

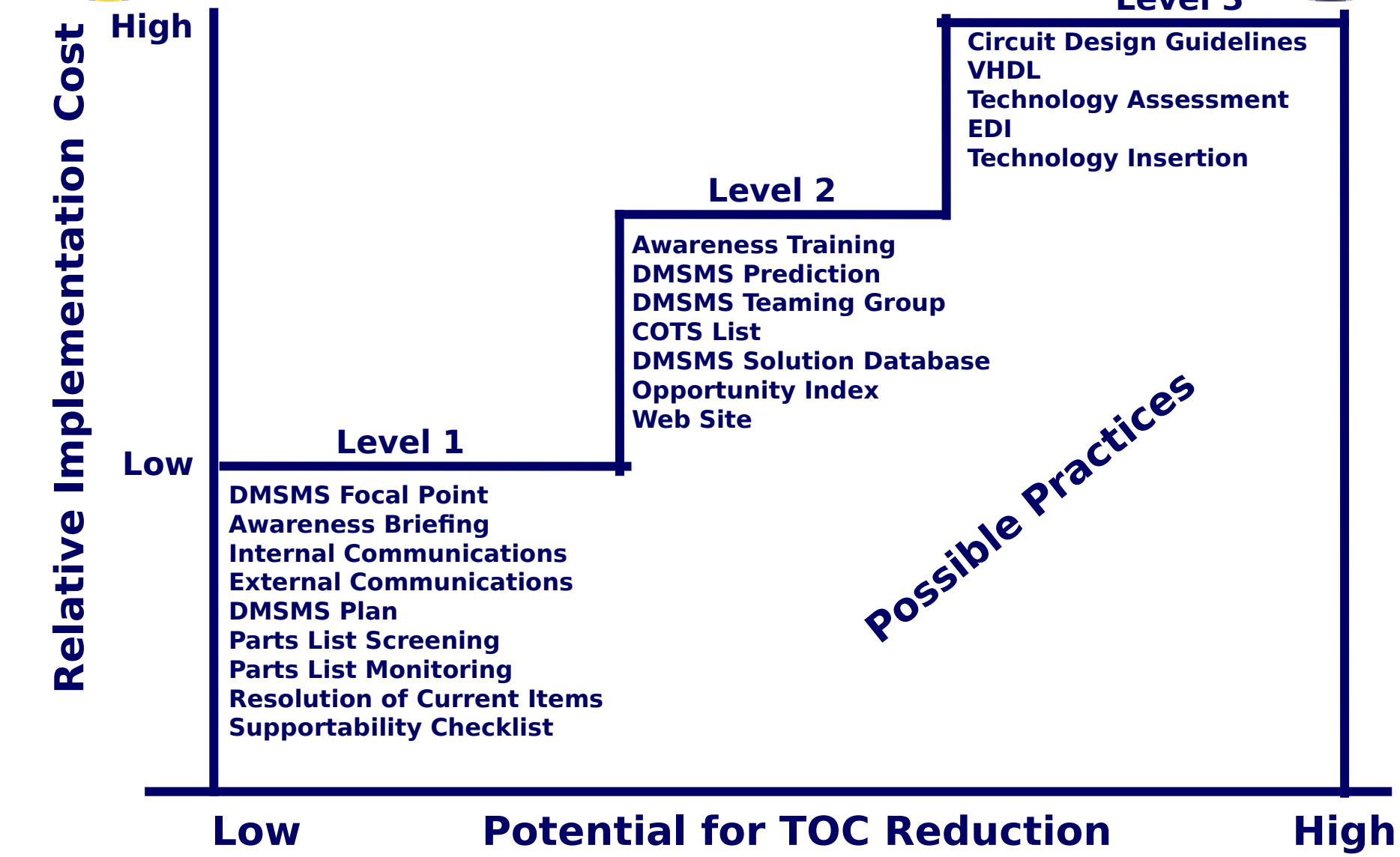
- Higher management (above PM) awareness of supportability problems
- >20% of parts unsupportable
- >20 years remaining in system life cycle
- Opportunity to enhance supportability or reduce total cost of ownership

…implement any of these

- Circuit Design Guidelines
- VHDL
- Technology Assessment
- EDI
- Technology Insertion

…also consider any Level 1 or 2 practices

Stepping Up to Minimize the Risk Of Obsolescence



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DMSMS Resolution Cost Metrics Overview

Resolution Cost Metrics: Background

- DoD DMSMS Working Group had concerns about available cost data:
  - Inconsistent reporting methods, no standard methodology
  - Lack of historical cost data & average cost avoidance values on common resolutions
  - No agreed-upon definition for cost avoidance metric established
- Documented cost avoidance is a performance metric on how well your DMSMS program is working
- With cost avoidance data, a PM can sell the benefits & return on investment (ROI) of a DMSMS program to those who control the budget

Resolution Cost Metrics: A Tool

- Resolution Cost Metrics are documented in *Resolution Cost Factors for DMSMS*
- *Resolution Cost Factors for DMSMS* :
  - Defines the resolution terms
  - Explains, in general, the savings associated with DMSMS resolutions
  - Gives historical numbers for typical cost savings

Data Collection Information

- Emphasis on microelectronics (Active Devices, FSC 5962)
- Source of data collected:
  - Actual DMSMS case data
  - New and legacy programs
  - Government and industry data
  - Data collected from previous reports
- Type of data collected:
  - Nonrecurring engineering (NRE) costs only
  - Administration and procurement costs excluded
  - Special testing cost (e.g., radiation hardening) not included
  - Normalized cost to constant 1999 US Dollars
- Determined low, average, and high resolution values
- Recurring engineering costs were not collected or reported

Cost Data Collected for Nonrecurring Factors

Resolution		Nonrecurring Cost Factors		
		Low	Average	High
Existing Stock		$ 0	$ 0	$ 0
Reclamation		1,000	2,000	3,000
Alternate		4,000	7,000	9,000
Substitute		15,000	19,000	24,000
Aftermarket		41,000	50,000	59,000
Emulation		55,000	72,000	89,000
	Minor	82,000	117,000	153,000
Redesign	Major	361,000	433,000	505,000
LOT Buy*		N/A	N/A	N/A

- Life of Type (LOT) Buy cost is program specific
- Chart data has been updated for 2002

Ongoing Improvements

- Study has been revised
  - 90% confidence bounds have been established to reduce the range in cost factors
  - Cost numbers are continually being updated
  - Cost estimates are established for each year through 2008

- Services require programs to maintain DMSMS records
  - Contact your services focal point for requirements
  - Records for “actual solutions and cost avoidance”
  - Please provide your data when requested

!!! ALL SOURCE DATA ARE KEPT CONFIDENTIAL !!!

Cost Metrics Example: B-2 DMS

B-2 Business Case Analysis Results (1997-2008)

Reactive		
Investment Cost*	$	0
Sustainment Cost	$	426M
Total Cost	$	426M
No. of solutions		1,903
Avg. cost/solution		$223,840
Avg. cost/flying hour	$	5,595

*constant year dollars

Proactive	
Investment Cost*	$ 47.3M
Sustainment Cost	$ 93.2M
Total Cost	$140.5M
No. of solutions	4,191
Avg. cost/solution	$ 33,510
Avg. cost/flying hour	$ 1,963
Net Value	$285.5M
Break Even Point	6 yrs
Benefit to Cost Ratio	7
Return on Investment	6

Source: B-2 Business Case Analysis – Col. David L. Gothard, DMSMS Conference 2000

Resolution Cost Metrics: Summary

- *Resolution Cost Factors for DMSMS*:
  - provides a standard methodology for determining cost avoidance
  - establishes default values when no program-specific values are available
  - are periodically updated for dollar-year relevance

- These cost factors were adopted by the industry:
  - Published in the EIA Engineering Bulletin, DMSMS Management Practices GEB1, November 2000
  - Referenced in “Take a Hybrid Approach to Component Obsolescence” COTS Journal, January 2001

- Documented cost avoidance is a performance metric on how well your DMSMS program is working

- After documenting cost avoidance, a PM has the ammunition to sell the benefits & return on investment (ROI) of a DMSMS program to those who control the budget

Questions or Comments?